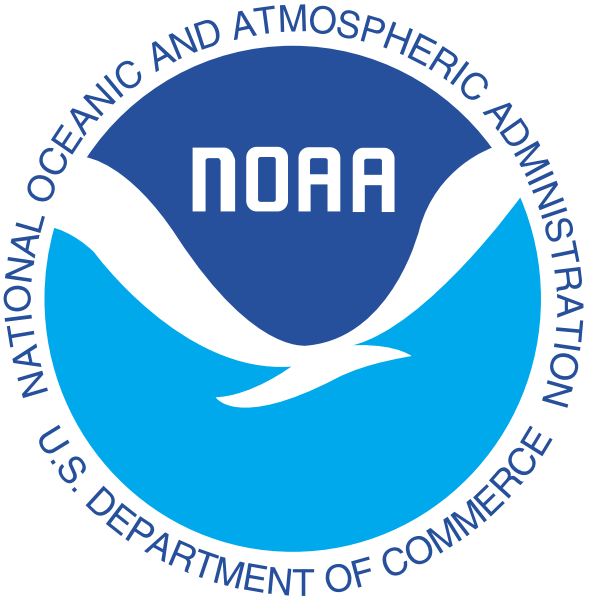
NOAA Coral Reef Information System – CoRIS

Metadata Standards and Guidelines



Version 1.2

CoRIS Metadata Team

http://www.coris.noaa.gov/

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TABLE OF CONTENTS

1 CoRIS

NOAA's Coral Reef Information System (CoRIS) is the official NOAA system for managing access to its coral reef data and information. CoRIS is a web-enabled, GIS-enhanced, state-of-the-art information system utilizing a single web portal to gain access to NOAA's coral reef data and information holdings, activities, and library services. CoRIS supports NOAA's contribution to the U.S. Coral Reef Task Force National Action Plan and provides a rich offering of search tools to aid in the discovery and interpretation of NOAA data and information on coral reef ecosystems and adjacent interrelated habitats and communities.

The route to locate the broad array of diverse coral reef data and information is through metadata, which are critical for the CoRIS sophisticated data search and discovery mechanism. The efficiency and profitability of the search strategy is only as good as the completeness and correctness of the metadata.

In order to ensure uniformity in metadata creation, and to ensure legal and policy requirements, CoRIS metadata adhere to the Federal Geographic Data Committee (FGDC) Standard. CoRIS scientific and IT developers identified complex and diverse metadata creation issues unique to coral reef data and information. As a result, CoRIS coral reef metadata guidelines and standards, and instructions were compiled to guide the metadata creator in the coral reef community. While specific to coral reef data, these standards and guidelines are relevant and useful to all NOAA data disciplines.

In order to facilitate the data and information discovery process, CoRIS developed hierarchically arranged suites of standardized keywords to be used in metadata to help characterize the data set described. Keywords designate categories that help to limit search criteria for geography, time, data products, data themes, parameters, methods and protocols.

A protocol for CoRIS metadata management was developed, which includes metadata preparation and contribution, review, storage and maintenance.

1.1 Audience

This document is intended for a principal investigator or a metadata creator working for a principal investigator. It is assumed that the reader of this document already has knowledge of data capture and data categorization. This document is focused on helping that individual with requirements for metadata that is to be contributed for inclusion in CoRIS.

1.2 Data Restrictions

In general, CoRIS data are available to everyone. For most data sets there are no restrictions, however, access to some data may be limited in order to protect sensitive biological resources. Such restrictions can be documented in the sections titled "Access_Constraints" and "Use_Constraints". If you have questions about restricting access to data, contact the CoRIS Metadata Coordinator at Coris@noaa.gov .

2 CoRIS Metadata

Just as the library card catalog is the way to find books and journals, the route to NOAA coral reef data and information is through metadata. For the person searching for coral reef data, concise, complete and accurate descriptions of data are essential to (1) finding, and (2) understanding the data.

Metadata are important for the CoRIS data search and discovery mechanism. They support the effective, long-term use of the data being served. To ensure uniformity in metadata, and to meet Federal requirements, CoRIS metadata adhere to the Federal Geographic Data Committee (FGDC) standard for geospatial data. This document outlines standards and guidelines for creating metadata for CoRIS.

3 What are Metadata?

Metadata consist of information that characterize data sets and provide documentation for data and data products. In essence, metadata answer who, what, when, where, why, and how about the data that are being documented.

The FGDC standard contains explanatory text and FAQs about metadata. In addition, the following three web sites contain useful material:

1. Coastal Metadata with Metadata Bob, found at http://www.csc.noaa.gov/metadata/text/bob_products.html.

2. A metadata training course developed by FGDC and CSC can be found at http://www.csc.noaa.gov/metadata/curriculum/ .

3. USGS, Metadata in plain language, found at http://geology.usgs.gov/tools/metadata/tools/doc/ctc/.

Sample metadata records are provided in Appendix A.

4 Metadata Principles

Development and management of CoRIS metadata are based on the following principles.

1. Metadata are central to CoRIS data and information search and discovery.
2. CoRIS metadata structure is based on existing standards – MARC, FGDC, and FGDC extensions, including NOAA, Biological and Shoreline.
3. Metadata are reviewed for completeness and compliance with CoRIS standards to ensure proper functioning of CoRIS data discovery operations.
4. Data linkages from metadata should not lead users to web sites that must be searched yet again.
5. Metadata are preserved in a secure environment to guard against loss and ensure continuing availability.
6. Metadata are periodically updated to reflect changes in the data set(s), data access and/or other information contained in metadata files.

5 Metadata Standards

CoRIS metadata standards begin with the content standard defined by the Federal Geographic Data Committee. If your data include biological taxonomy, the National Biological Information Infrastructure (NBII) extensions to the FGDC content standard should be used. A proposed extension to FGDC for shoreline data, may be used to document the critical processes and conditions that involve creating and collecting shoreline data.

Full documentation is available for the three content standards:

FGDC - http://www.fgdc.gov/metadata/contstan.html
NBII - http://www.nbii.gov/datainfo/metadata/standards/index.html
Shoreline - http://www.fgdc.gov/standards/status/sub5_6.html

The elements identified below are required for the CoRIS search and discovery mechanisms and to conform to FGDC standards:

Section 1: Identification
- 1.1 Citation - Use of Online Linkage (Section 8.10) information is mandatory if the originator of the data maintains the data at an online location.
- 1.2 Description
- 1.3 Time Period of Content
- 1.4 Status
- 1.5 Spatial Domain
- 1.6 Keywords
- 1.6 ½ Taxonomy (mandatory for biological data)
- 1.7 Access Constraints
- 1.8 Use Constraints

Section 6: Distribution
- 6.1 Distributor
- 6.3 Distribution Liability
- 6.4 Standard Order Process - Use of Network Resource Name (6.4.2.2.1.1.1.1) is required for data served by a distribution center, such as an archive or data center.

Other Portions of Section 6 are mandatory if they are applicable.
- 7.0 Metadata Reference Information
- 7.1 Metadata Date
- 7.2 Metadata Review Date
- 7.3 Metadata Contact (Contact Information)
- 7.4 Metadata Standard Name
- 7.5 Metadata Standard Version

Other sections are mandatory if applicable. In particular, Section 2 Data Quality, and Section 4 Spatial Reference, if applicable, should be included for quantitative data (e.g. numeric data files, video transects, etc.). Section 3 Spatial Data Organization, Section 5 Entity and Attribute, if applicable, should be used for spatial data (e.g. maps, georeferenced images, GIS files). When at all possible, fill in as many sections as you can. The more complete a metadata record, the greater its value.

Appendix B. contains a template of recommended CoRIS metadata elements.

6 Metadata Guidelines

The following sections provide information to assist in creating and submitting metadata to CoRIS.

6.1 Creating Metadata

Metadata can be created through use of software designed for that purpose, or by using a text editor. The text editor or word processor option is used to edit a template document that contains all or most of the possible metadata elements, and to add text to those elements that are appropriate. Unnecessary or empty elements should not be used. To repeat an element copy and paste as many as are needed. ASCII templates are simple to use, require no Geographic Information System (GIS) software or other specialized software, and may be cloned for parts of the metadata that are common to several data sets. A major drawback for templates is that there is no built in control of the structure. In the process of cutting and pasting it is easy to damage the structure of the template so it is no longer FGDC compliant.

For CoRIS metadata contributors, an ASCII template of required and mandatory-if-applicable fields for CoRIS is available in Appendix B. Use this template if it is appropriate for describing your data. If not, an ASCII template of the full FGDC metadata is available from Appendix C. and also in http://badger.state.wi.us/agencies/wlib/sco/metatool/template.htm.

To assist in evaluating metadata authoring software, Appendix D. offers brief reviews of several resources. This list does not imply endorsement by CoRIS, NOAA, or the Federal Government.

Whichever method is used to create metadata, the final product should be provided to CoRIS in ASCII text form, and/or as an XML or SGML file.

Authors are encouraged to use the CNS (Chew aNd Spit) and MP (Metadata Parser) tools for error checking. MP checks for consistency with the FGDC standards and provides for export of metadata in XML (eXtensible Markup Language), SGML (Standard Generalized Markup Language), and HTML (HyperText Markup Language), if desired. For additional information, see http://www.geology.usgs.gov/tools/metadata . Please note that program CNS might create problems with taxonomic information (see Section 6.4).

For more useful information about the FGDC standard and creating metadata see http://geology.usgs.gov/tools/metadata/tools/doc/faq.html#1.1

6.2 A Note about Keywords

Keywords are very important in making it possible for someone searching for data to find those data sets that meet their search criteria. Metadata should include keywords from the CoRIS Thesaurus, which includes ‘Theme’ keywords, ‘Place’ keywords, and a set of ‘Discovery’ keywords that identify data according to type. Most datasets will have at least one place and one discovery keyword, in addition to one or more theme keywords. The CoRIS Thesaurus is available at

http://www.coris.noaa.gov/backmatter/supportingdocs.html

6.3 Specifying Dates and Positions

Date and geographic position information are required to properly locate the data in time and space. This section provides guidance and some samples for completing date and bounding coordinate fields.

The date for the standard is represented as follows:

A.D. Era to December 31, 9999 A.D.:
YYYY for year,
YYYYMM for month of a year, and
YYYYMMDD for a day of the year

A.D. Era after 9999 A.D.: cdYYYYYYY

B.C. Era to 9999 B.C.:
bcYYYY for year,
bcYYYYMM for month of a year, and
bcYYYYMMDD for a day of the year

B.C. Era before 9999 B.C.: ccYYYYYYY

Element 1.3, Time Period of Content, includes Beginning_Date and Ending_Date fields, under Range_of_Dates/Times. Dates of the data set being described by the originator should be the dates during which the conditions that are represented by the data occurred, not the data collection or data publication dates. For example, for paleoclimate data, the dates are those of the environmental conditions observed and the data collection dates of aerial photography are the dates of the data. For near real-time data, *still being collected*, enter the earliest date of the data or product in Beginning_Date. Enter the word “Present” in the field Ending_Date.

The geographic position for the standard is represented as follows:

Latitude is represented as DD.DDD in decimal degrees.
Northern hemisphere is positive and southern hemisphere is negative (-).

Longitude is represented as DDD.DDD in decimal degrees.
Eastern hemisphere is positive and western hemisphere is negative (-).

A sample of bounding coordinates for a single position in the northwest quadrant is:

West_Bounding_Coordinate: -120.00
East_Bounding_Coordinate: -120.00
North_Bounding_Coordinate: 38.236
South_Bounding_Coordinate: 38.236

Bounding coordinates of a rectangle in the southeastern hemisphere might be:

West_Bounding_Coordinate: 115.345
East_Bounding_Coordinate: 122.500
North_Bounding_Coordinate: -35.122
South_Bounding_Coordinate: -38.236

Sample bounding coordinates for a rectangle straddling the equator and 180 degree meridian:

West_Bounding_Coordinate: 175.345
East_Bounding_Coordinate: -178.500
North_Bounding_Coordinate: 8.236
South_Bounding_Coordinate: -5.122

6.4 Taxonomy

Users of CoRIS will be able to find data about specific taxa only if that information is included in the metadata. Taxonomy is to be included from the highest to the lowest classification level possible to provide valuable biological information and make the metadata more useful. The National Biological Information Infrastructure (NBII) extension of the FGDC content standard is used to document taxonomic keywords, classification system(s) used, methodology, analytical tools, taxonomic classifications, etc. Data originators are encouraged to compare all species names with the Integrated Taxonomic Information System (ITIS) and to document the classification system used for their taxonomy**.** ITIS is available at http://www.itis.usda.gov/ .

CoRIS requests the following metadata elements for taxonomy:

Taxonomy:
Keywords/Taxon:
Taxonomic_Keyword_Thesaurus:
Taxonomic_Keywords:
Taxonomic_System:
Classification_System/Authority:
Classification_System_Citation:
General_Taxonomic_Coverage:
Taxonomic_Classification:
Taxon_Rank_Name:
Taxon_Rank_Value:
Applicable_Common_Name:

Sample 2., in Appendix A., contains a sample metadata record with these taxonomy elements.

For complete taxonomy metadata elements and definitions see

http://www.fgdc.gov/standards/status/sub5_2.html and

http://www.nbii.gov/datainfo/metadata/standards/index.html.

To properly represent taxonomic classification of more than one entity, indentation and nesting of the lines of a text file is presently used to define the taxonomic hierarchy. In XML, the hierarchy is maintained with nesting using the opening and closing XML tags; <taxoncl>, <taxonrn>, </taxonrn>, <taxonrv>, </taxonrv> and </taxoncl>.

Caveats:

The following problem has occurred using the present version of the metadata pre-parser (CNS). Hopefully, this will be rectified soon. (Possibly a configuration file problem).

CNS (a text preparsing/metadata structuring program) indents taxonomy so that the resulting output drifts from left to right, which nests the entire taxonomic hierarchy around the last organism classification.

If the taxonomy is properly indented in a text metadata file, it can be processed through MP directly to produce a good XML file or an SGML file that can then be converted to XML with a simple edit. To convert a file from SGML to XML remove the line

<!DOCTYPE FGDC METADATA "-//FGDC//DTD METADATA 1.0//EN">

and replace it with <?xml version="1.0" encoding="ISO-8859-1"?>

Please contact the Metadata Coordinator at Coris@noaa.gov if you have questions about including taxonomic information in your metadata.

6.5 Parent/Child Metadata

Some data sets are composed of many similar products that differ from each other only in product date/time, or geographic location, or both. For example, "Degree Heating Week Charts" is a product that is tailored for coral reef monitoring from AVHRR satellite data. Charts are produced about twice weekly and maintained for online access. The charts for one year, taken together, make up one data collection, but individually, each chart presents information about a specific date. The parent metadata record describes the collection and provides a link to the website that contains links to all date-specific products. CoRIS uses child metadata to give users the ability to find only those products that meet their specific needs for dates and/or geographic regions. For example, someone searching for data within a narrow date range of one month will be given only those products that fall within that month.

The parent metadata file is a normal, complete metadata record that describes the collection, its content, geographic extent and overall dates of coverage, as well as other source and distribution information. Each child, however, contains information specific to each product – its geographic location, specific date, and a link to the product being documented. Several child records that accompany the parent metadata for Degree Heating Week Charts in the Eastern Hemisphere for the year 2000 are included here for illustration.

Eastern Hemisphere,19991006,20000104,http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.4.2000.gif
Eastern Hemisphere,19991010,20000108,http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.8.2000.gif
Eastern Hemisphere,19991013,20000111,http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.11.2000.gif
Eastern Hemisphere,19991017,20000115,http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.15.2000.gif

Fields of these child records are separated by commas. In this example, the fields are:

Geographic region
Start date of product
End date of product
URL for the product

These fields are appropriate for this particular dataset, but other fields may be needed for a different dataset. For example, a data set whose child products vary by geography rather than by date should include the bounding coordinates of each child.

If you plan to document your data in this way, please be sure to include the following:

(1) a complete metadata description of the data collection – the parent metadata,
(2) a file of comma-separated values that make up the child metadata for each product,
(3) a description of the child fields and any other information you think may be needed to interpret the metadata.

To ensure that the parent and child metadata files are related, please use the parent filename with "_C" added as a suffix for the file of child metadata.

Please contact the CoRIS Metadata Coordinator at CoRIS@noaa.gov for guidance in developing parent-child metadata if you have questions about what is needed.

6.6 Metadata Flow and Contributing Metadata

The creator of the metadata, who may be the principal investigator or another individual, uses their special knowledge of the data to create metadata. The metadata creator will include CoRIS keywords as described in Section 6.2. The metadata creator may use any tool to create well-structured metadata records in ASCII text, XML, or SGML. (Tools for metadata creation are described in Appendix D.).

Once the metadata record has been created, the responsible principal investigator reviews the record. The purpose of this review is to ensure that the scientific content, such as the data set description, methodology, etc., is correct. Programs CNS and MP, available at http://geology.usgs.gov/tools/metadata, assist in checking the format and completeness of metadata. Note the caveat in Section 6.4 about using CNS with metadata records containing taxonomy.

The CoRIS metadata staff works with principal investigators or their metadata contacts to assist and answer questions about format, content, or how to transfer files. When a metadata file is received by CoRIS, CoRIS personnel will review the metadata file and work with contributors to develop conforming data set descriptions. The primary items addressed in the metadata review are presented in Section 7.0.

Contact the CoRIS metadata coordinator if you have questions about creating or contributing metadata at Coris@noaa.gov .

Unique Tracking Identifier

To assist the identification and tracking of a contributor's metadata within CoRIS during the initial review and for applying future updates, a unique metadata tracking identifier will be used. It is simply the concatenation of the metadata filename (limited to 40 characters) given by the author, the number of child records, and a sequence number assigned by CoRIS, each separated by underscores. Upon receipt of a metadata file, CoRIS staff will acknowledge receipt and provide the complete tracking identifier. For example, sanjuan_westbank_0_000345.

If a parent metadata filename is sanjuan_westbank_10, this will indicate 10 child records and the child file name would be sanjuan_westbank_C, where "C" indicates it is a child file."

When the principal investigator is satisfied with the metadata, final ASCII text and/or XML/ SGML versions of the metadata record are created for shipment to CoRIS. Using ftp, the completed metadata records are transmitted to the CoRIS "drop box" at ftp://ftp.nodc.noaa.gov/pub/incoming/CoRIS

Also, please send an email message to Coris@noaa.gov to identify the metadata source, the project, data set title, the filename (see Unique Tracking Identifier above), the number of child records (if applicable), the metadata author and contact information. If any unusual characteristics pertain to the data, or metadata, please make note of them.

6.7 Updates and Other Changes

To maintain currency of metadata, it must be updated when the described data set, data access URL, or any contact information changes. CoRIS will work with contributors to modify metadata or replace existing metadata with an updated file. In the event that changes to your metadata are necessary, please contact the Metadata Manager at Coris@noaa.gov .

7 Metadata Review

Metadata files are the means by which coral reef data sets can be discovered in the CoRIS web site. They hold the information a user will search to decide whether or not the described data set is of interest. CoRIS recognizes that those who collect and understand the data are in the best position to provide clear descriptions of data in metadata files.

The following are the primary items reviewed by CoRIS:

1. Are all required field names present, including place-holding names? The set of required fields for CoRIS are listed in the template (Appendix B.). If required fields are missing, CoRIS will work with the metadata originator to complete the metadata file in question.

2. Does the title describe the data adequately; usually the title should answer the 'what', 'where' and possibly 'when' of the data.

3. Is the abstract a good summary description?

4. Are CoRIS keywords included?

5. Are the structure and content of metadata fields valid? The software MP (Metadata Parser) is used for these tests. CoRIS will work with the metadata contributor to improve the metadata file, if needed.

6. Are data made available online or, if not, are instructions provided for offline access?
    a. If data are served from the data originator's site, the URL that leads to data would be included in Online_Linkage.
    b. If data are being made available online from a distribution center, the URL that leads to data would be in Network_Resource_Name.
    c. If a preview or browse graphic is available, the URL that leads to it would be included in Browse_Graphic.
    d. If data are being made available offline, instructions for data access would be found in Ordering_Instructions.

7. Do URL links lead to browse graphics and/or data sets?

8. If child metadata are included, fields in child records will also be reviewed. The temporal and spatial extents of the parent metadata must encompass the collection of respective child records minimum and maximum temporal and spatial values. Be sure to provide new parent spatial, and/or temporal extents, when sending new child records for an existing CoRIS parent metadata record, if applicable.

9. After new metadata files are added to CoRIS, the system will be tested to make sure that CoRIS returns the same information that was provided by the contributor.

8 Instructions for completing metadata fields

The following contains instructions for a metadata record following the FGDC format and CoRIS NBII elements. For further information, please see http://geology.usgs.gov/tools/metadata/tools/doc/ctc/ .

Instructions: Capitalized words are instructions, or provide an example or suggested value. Some fields or groups can be repeated. For example, Originator can be repeated to name more than one person.
NOTE: Underlined field names must be included, or are to be included if applicable.

Metadata:
  Identification_Information:
    Citation:
      Citation_Information:
        Originator:
          ENTER THE NAME OF THE DATA ORIGINATOR HERE; may be repeated
        Publication_Date:
          ENTER DATE IN THE FORM YYYYMMDD or YYYYMM.
        Title:
          CREATE A MEANINGFUL TITLE FOR THESE DATA IF ONE DOES NOT ALREADY EXIST
          Guidelines for creating a title: Where/What/When/How
        Online_Linkage:
          Mandatory if applicable.
          ENTER THE ONLINE LOCATION OF THE DATA AS MAINTAINED BY THE ***ORIGINATOR OF THE DATA***. Do not include this field if the originator does not maintain the data online. If possible the location should be expressed as a URL. The URL provided should link either directly to the data or to a web page that is as close as possible to the data, accompanied by access instructions. Linking to the home page of a program or organization will necessitate further searching on the part of the user.
    Description:
      Abstract:
        COPY AN EXISTING ABSTRACT OR CREATE A BRIEF ABSTRACT THAT DESCRIBES THE DATA SET.
      Purpose:
        STATE THE PURPOSE FOR WHICH THESE DATA WERE COLLECTED.
    Time_Period_of_Content:
      Time_Period_Information:
        USE ONE OF THREE OPTIONS – SINGLE DATE, MULTIPLE DATES OR RANGE OF DATES.
        Single_Date/Time:
          Calendar_Date:
            ENTER SINGLE DATE, IF DATA WERE COLLECTED DURING ONE DAY, ONE MONTH OR ONE YEAR. FORMAT IS YYYYMMDD, YYYYMM, *OR YYYY*.
        Multiple_Dates/Times:
          REPEAT THIS ENTIRE GROUP FOR MULTIPLE DATES.
          Single_Date/Time:
            Calendar_Date:
              ENTER CALENDAR DATE ON WHICH DATA WERE COLLECTED.
        Range_of_Dates/Times:
          Beginning_Date:

EARLIEST DATE OF OBSERVATION IN THESE DATA Use the format YYYY, YYYYMM, or YYYYMMDD, depending on how much you know about these data. For real-time data sets, enter the beginning date of the series of real-time data or products.

Ending_Date:

LATEST DATE OF OBSERVATION IN THESE DATA Use the format YYYY, YYYYMM, or YYYYMMDD, depending on how much you know about these data. For real-time data sets, enter the word "Present".

Currentness_Reference:

CHOOSE FROM "Ground condition", meaning data represent conditions on or during the dates specified, or "Publication date", meaning date on which data were published.

Status:

Progress:

CHOOSE FROM "In work", "Complete"

Maintenance_and_Update_Frequency:

CHOOSE FROM "As needed", "None", OR SOME OTHER TIME PERIOD ("Weekly", "Yearly", etc.) THAT APPLIES TO THESE DATA

Spatial_Domain:

Description_of_Geographic_Extent:

A SHORT DESCRIPTION OF THE AREAL DOMAIN OF THE DATASET.

Bounding_Coordinates:

West_Bounding_Coordinate:

WESTERNMOST LONGITUDE OF DATA EXTENT IN DECIMAL DEGREES, WESTERN HEMISPHERE IS NEGATIVE, EASTERN HEMISPHERE IS POSITIVE.

East_Bounding_Coordinate:

EASTERNMOST LONGITUDE OF DATA EXTENT IN DECIMAL DEGREES, EASTERN HEMISPHERE IS POSITIVE, WESTERN HEMISPHERE IS NEGATIVE.

North_Bounding_Coordinate:

NORTHERNMOST LATITUDE OF DATA EXTENT IN DECIMAL DEGREES, NORTHERN HEMISPHER IS POSITIVE, SOUTHERN HEMISPHERE IS NEGATIVE.

South_Bounding_Coordinate:

SOUTHERNMOST LATITUDE OF DATA EXTENT IN DECIMAL DEGREES, SOUTHERN HEMISPHERE IS NEGATIVE, NORTHERN HEMISPHERE IS POSITIVE.

Keywords:

Theme:

THEME KEYWORDS ARE MANDATORY.

Theme_Keyword_Thesaurus:

ENTER "CoRIS Theme Keyword Thesaurus 1.0". You may repeat this element with other thesauri, if necessary for your data. To do that, repeat the "Theme_Keyword_Thesaurus:" element and then list the keywords from that thesaurus.

Theme_Keyword:

*KEYWORD FROM THE THESAURUS NAMED ABOVE May be repeated unlimited number of times. All keywords must be preceded by "Theme_Keyword**:. Include one and only one keyword from the Discovery Thesaurus.***

Place:

PLACE KEYWORDS ARE OPTIONAL; may be repeated.

Place_Keyword_Thesaurus:

PICK ONE (OR MORE) OF THE AVAILABLE PLACE THESAURI IN SECTION 6.2 TO CHARACTERIZE THESE DATA You can use more than one of these choices in one record, just repeat the "Place_Keyword_Thesaurus:" element and then list the keywords from that thesaurus.

Place_Keyword:

KEYWORD FROM THE PLACE THESAURUS NAMED ABOVE May be repeated unlimited number of times. All keywords must be preceded by " Place_Keyword:"

Stratum:

STRATUM KEYWORDS ARE OPTIONAL; may be repeated.

Stratum_Keyword_Thesaurus:

PICK ONE (OR MORE) OF THE AVAILABLE STRATUM THESAURI TO CHARACTERIZE THESE DATA Primary choices are "CoRIS Keyword Thesaurus". You can use more than one of these choices in one record, just repeat the "Stratum_Keyword_Thesaurus:" element and then list the keywords from that thesaurus.

Stratum_Keyword:

KEYWORD FROM THE STRATUM THESAURUS NAMED ABOVE May be repeated unlimited number of times. All keywords must be preceded by " Stratum_Keyword:"

Taxonomy:

TAXONOMY KEYWORDS ARE MANDATORY IF DATA INCLUDE TAXON IDENTITY.

Keywords/Taxon:

Taxonomic_Keyword_Thesaurus:

PICK ONE (OR MORE) OF THE AVAILABLE TAXONOMIC THESAURI TO CHARACTERIZE THESE DATA. You can use more than one of these choices in one record, just repeat the "Keywords/Taxon:" element and then list the thesaurus and the keywords from that thesaurus.

Taxonomic_Keywords:

ENTER ONE OR MORE TAXONOMIC KEYWORDS, EACH ONE PRECEDED BY "Taxonomic_Keywords:".

Taxonomic_System:

MAY BE ONE OR MORE. REPEAT AS NEEDED.

Classification_System/Authority:

INFORMATION ABOUT THE CLASSIFICATION SYSTEM OR AUTHORITY USED.

Classification_System_Citation:

Citation_Information:

A CITATION FOR THE CLASSIFICATION SYSTEM OR AUTHORITY USED; defines the authority used for classifying organisms. Use all appropriate citation elements.

General_Taxonomic_Coverage:

OPTIONAL.

A DESCRIPTION OF THE RANGE OF TAXA ADDRESSED IN THE DATA SET OR COLLECTION.

Taxonomic_Classification:

Taxon_Rank_Name: Kingdoms

Taxon_Rank_Value: Animalia, Plantae, Monera

ENTER KINGDOMS AS APPROPRIATE FOR ALL TAXA IN THE DATASET.

Taxonomic_Classification:

Taxon_Rank_Name:

ENTER THE RANK OR LEVEL in the taxonomy. Examples are "Kingdom", "Genus", etc.

Taxon_Rank_Value:

ENTER THE NAME REPRESENTING THE TAXONOMIC RANK.

Applicable_Common_Name:

ENTER ANY APPLICABLE COMMON NAMES for the given taxonomic rank and value. *This element can be repeated for multiple common names.*

See Appendix A., Sample 2 for an example of taxonomy.

Access_Constraints:

ENTER "None" OR SPECIFY ACCESS CONSTRAINTS. IF THERE ARE ACCESS CONSTRAINTS, PLEASE SPECIFY HOW A USER CAN ASK FOR THE DATA.

Use_Constraints:

ENTER "None" OR SPECIFY USE CONSTRAINTS, SUCH AS "Please cite contributors when using this data".

Browse_Graphic:

This group is to be used to identify the URL of a preview of browse graphic file. It is optional and repeatable.

Browse_Graphic_File_Name:

MANDATORY FOR BROWSE_GRAPHIC. Enter the name of a related graphic file that provides an illustration of the data set.

Browse_Graphic_File_Description:
MANDATORY FOR BROWSE_GRAPHIC. Enter a text description of the illustration.
Browse_Graphic_File_Type:
MANDATORY FOR BROWSE_GRAPHIC. Enter the graphic file type of a related graphic file, from the following list.
"CGM".....Computer Graphics Metafile
"EPS".....Encapsulated Postscript format
"EMF".....Enhanced Metafile
"GIF".....Graphic Interchange Format
"JPEG".....Joint Photographic Experts Group format
"PBM".....Portable Bit Map format
"PS".....Postscript format
"TIFF".....Tagged Image File Format
"WMF".....Windows metafile
"XWD".....X-Windows Dump

Distribution_Information:
THIS ENTIRE GROUP CAN BE REPEATED
Distributor:
Contact_Information:
NOTE: INCLUDE EITHER CONTACT PERSON PRIMARY OR CONTACT ORGANIZATION PRIMARY.
Contact_Person_Primary:
Contact_Person:
Enter the name of the contact person.
Contact_Organization_Primary:
Contact_Organization:
NAME OF THE ORGANIZATION FROM WHOM THE DATA MAY BE OBTAINED
Contact_Address:
THIS ENTIRE GROUP CAN BE REPEATED
Address_Type:
"MAILING', OR "PHYSICAL", OR BOTH
Address:
STREET OR MAILING ADDRESS
City:
CITY NAME
State_or_Province:
STATE OR PROVINCE NAME
Postal_Code:
POSTAL CODE
Country:
COUNTRY
Contact_Voice_Telephone:
THE TELEPHONE NUMBER BY WHICH INDIVIDUALS CAN SPEAK TO THE ORGANIZATION OR INDIVIDUAL; can be repeated.
Distribution_Liability:
STATEMENT OF LIABILITY, IF ANY, ASSUMED BY THE DISTRIBUTOR
FOR EXAMPLE: NOAA makes no warranty regarding these data, expressed or implied, nor does the fact of distribution constitute such a warranty. NOAA and NODC cannot assume liability for any damages caused by any errors or omissions in these data, nor as a result of the failure of these data to function on a particular system.
Standard_Order_Process:
USE NON-DIGITAL FORM FOR DATA AVAILABLE IN NON-DIGITAL FORM; USE DIGITAL FORM FOR DATA AVAILABLE IN DIGITAL FORM; can be repeated.
Non_Digital_Form:
DESCRIBE HOW TO OBTAIN DATA IN NON-DIGITAL FORM.
Digital_Form:

THIS ENTIRE GROUP CAN BE REPEATED

Digital_Transfer_Information:

Format_Name:

THE NAME OF THE DATA TRANSFER FORMAT, USING ONE OF THE FOLLOWING:

"ARCE" . . . . . ARC/INFO Export format

"ARCG" . . . . . ARC/INFO Generate format

"ASCII". . . . . ASCII file, formatted for text attributes, declared format

"BIL". . . . . Imagery, band interleaved by line

"BIP". . . . . Imagery, band interleaved by pixel

"BSQ". . . . . Imagery, band interleaved sequential

"CDF". . . . . Common Data Format

"CFF". . . . . Cartographic Feature File (U.S. Forest Service)

"COORD". . . . . User-created coordinate file, declared format

"DEM". . . . . Digital Elevation Model format (U.S. Geological Survey)

"DFAD" . . . . . Digital Feature Analysis Data (National Imagery and Mapping Agency)

"DGN". . . . . Microstation format (Intergraph Corporation)

"DIGEST" . . . . Digital Geographic Information Exchange Standard

"DLG". . . . . Digital Line Graph (U.S. Geological Survey)

"DTED" . . . . . Digital Terrain Elevation Data (MIL-D-89020)

"DWG". . . . . AutoCAD Drawing format

"DX90" . . . . . Data Exchange '90

"DXF". . . . . AutoCAD Drawing Exchange Format

"ERDAS". . . . . ERDAS image files (ERDAS Corporation)

"GRASS". . . . . Geographic Resources Analysis Support System

"HDF". . . . . Hierarchical Data Format

"IGDS" . . . . . Interactive Graphic Design System format (Intergraph Corporation)

"IGES" . . . . . Initial Graphics Exchange Standard

"MOSS" . . . . . Multiple Overlay Statistical System export file

"netCDF" . . . . network Common Data Format

"NITF" . . . . . National Imagery Transfer Format

"RPF". . . . . Raster Product Format (National Imagery and Mapping Agency)

"RVC". . . . . Raster Vector Converted format (MicroImages)

"RVF". . . . . Raster Vector Format (MicroImages)

"SDTS" . . . . . Spatial Data Transfer Standard (Federal Information Processing Standard *173)*

"SIF". . . . . Standard Interchange Format (DOD Project 2851)

"SLF". . . . . Standard Linear Format (National Imagery and Mapping Agency)

"TIFF" . . . . . Tagged Image File Format

"TGRLN". . . . . Topologically Integrated Geographic Encoding and Referencing (TIGER) Line format (Bureau of the Census)

"VPF". . . . . Vector Product Format (National Imagery and Mapping Agency)

"free text". . . . . Name of local or other format.

Digital_Transfer_Option:

USE ONLINE OPTION IF DATA ARE AVAILABLE ONLINE, OR OFFLINE OPTION IF DATA ARE NOT AVAILABLE ONLINE; can be repeated.

Online_Option:

Computer_Contact_Information:

Can be repeated.

Network_Address:

Network_Resource_Name:

THE ELECTRONIC ADDRESS AND NAME OF THE FILE OR SERVICE FROM WHICH THE DATA SET CAN BE OBTAINED. Network Resource Name is the name of the file or service from which the data set can be obtained from a distributor, such as NCDC, NGDC, or NODC. The URL provided should link either directly to the data or to a web page that is as close as possible to the

data, accompanied by access instructions. Linking to the home page of a program or organization will necessitate further searching on the part of the user.

Offline_Option:
Offline_Media:
ENTER ONE OF THE FOLLOWING:
"CD-ROM"
"3-1/2 inch floppy disk"
"5-1/4 inch floppy disk"
"9-track tape"
“4 mm cartridge tape"
"8 mm cartridge tape"
"1/4-inch cartridge tape"
Free text description of media.
Recording_Format:
DESCRIBE THE RECORDING FORMAT WITH FREE TEXT OR:
"cpio"
"tar"
"High Sierra"
"ISO 9660"
"ISO 9660 with Rock Ridge extensions"
"ISO 9660 with Apple HFS extensions"

Fees:
DESCRIBE THE FEES AND TERMS, IF ANY, FOR RETRIEVING THE DATA SET.
Ordering_Instructions:
IF YOU (THE DATA ORIGINATOR) PLAN TO DISTRIBUTE THE DATA OFFLINE, PLEASE INCLUDE INSTRUCTIONS FOR ORDERING DATASET COPIES.

Metadata_Reference_Information:
Metadata_Date:
DATE METADATA DESCRIPTION WAS CREATED Use the YYYYMMDD format.
Metadata_Contact:
Contact_Information:
USE EITHER CONTACT PERSON PRIMARY OR CONTACT ORGANIZATION PRIMARY
Contact_Person_Primary:
Contact_Person:
NAME OF PERSON CREATING THE METADATA FOR THESE DATA
Contact_Organization_Primary:
Contact_Organization:
ENTER THE NAME OF THE ORGANIZATION
Contact_Address:
THIS ENTIRE GROUP CAN BE REPEATED.
Address_Type:
ENTER “Mailing” OR “Physical”.
Address:
MAILING AND/OR PHYSICAL ADDRESS OF THE PERSON NAMED ABOVE. This element may be a single line or multiple lines. City, State, Zip/postal code, country, telephone, fax, and email address go in the specific, self-explanatory elements that follow.
City:
CITY IN ADDRESS
State_or_Province:
STATE IN ADDRESS
Postal_Code:
5 OR 9 DIGIT US ZIP CODE OR INTERNATIONAL POSTAL CODE
Country:

COUNTRY NAME It is not necessary to use US, USA, or America. Use for non-US addresses.

Contact_Voice_Telephone:

PHONE NUMBER; can be repeated.

Metadata_Standard_Name:

PICK ONE OF:

"FGDC Content Standard for Digital Geospatial Metadata with NOAA Extensions"

"NBII Content Standard for National Biological Information Infrastructure Metadata"

Metadata_Standard_Version: *FGDC-STD-001-1998, OR RESPECTIVELY, FGDC-STD-001.1-1999*

Appendix A. Sample Metadata Records

Sample 1

This sample is an abbreviated form of a metadata file that includes more complete information than is shown here. It was abbreviated to show the essential elements for CoRIS, plus a few optional fields, to make it interesting.

IDENTIFICATION_INFORMATION:
Citation:
Citation_Information:
Originator: NOAA Coral Reef Watch Program
NOAA National Environmental Satellite Data and Information Service
Publication_Date: 20010602
Title: NOAA Experimental Satellite Twice-Weekly 50km Coral Reef Bleaching HotSpot Chart (Eastern Hemisphere)
Edition: One
Geospatial_Data_Presentation_Form: remote sensing image
Publication_Information:
Publication_Place: Suitland, Maryland, USA
Publisher: NOAA Coral Reef Watch Program
Online_Linkage: http://www.osdpd.noaa.gov/PSB/EPS/SST/data/hotspote.6.2.2001.gif
Description:
Abstract:
This product is the graphic display of an experimental satellite twice-weekly Coral Reef Bleaching HotSpots field of the Eastern Hemisphere at 50km resolution. The Coral Reef Bleaching HotSpot is a special type of sea surface temperature anomaly and is the difference of the sea surface temperature compared to a static SST climatology called Maximum Monthly Mean SST Climatology (MMMSST) that serves as a coral reef bleaching related threshold. Only the positive HotSpot anomalies are highlighted in the chart.
Experimental satellite twice-weekly 50km nighttime sea surface temperature (SST) field derived from satellite remotely sensed data from Advanced Very High Resolution Radiometer (AVHRR) carried on NOAA's Polar Orbiting Environmental Satellite (POES), NOAA-16, is used to derive this Coral Reef Bleaching HotSpot product. This chart and the corresponding sea surface temperature field are archived copies of the near real-time products produced twice-weekly.
Nighttime SST observations are used for producing the product to eliminate the diurnal variation caused by diurnal solar heating at the sea surface (primarily at the "skin" interface, 10-20 µm). More conservative assessment and prediction can be made from nighttime SST observations. For the same reason and consistency the MMMSST climatology used is also derived from nighttime SST.
The product is an archived copy of HotSpot charts produced twice-weekly in a near real-time fashion on every Tuesday and Saturday as the corresponding SST field does. The AVHRR-derived SST observations from the previous Saturday through the previous Monday are used for updating the SST field produced on Tuesdays and the observations from the previous Tuesday through the previous Friday are for Saturdays. For a twice-weekly period, at the pixels where no observation from the period due to cloud cover or other quality controls are available for updating SST values, the SSTs from the previous twice-weekly SST field at the corresponding pixels are processed to estimate the SST values at that time. As a result, complete twice-weekly SST field and Coral Reef bleaching HotSpot field are always presented.

Purpose:
The product was primarily developed as an NOAA Coral Reef Watch Program's thermally-induced coral reef bleaching early warning and assessment product along with other products including SST, SST anomaly, Degree Heating Weeks, Tropical Coral Bleaching Indices, and SST time series.
Products are intended for federal, state, and local government environmental decision makers, researchers, educators, resource managers, recreational users, and all others who are interested in it.
Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20010529
Ending_Date: 20010601
Currentness_Reference: publication date
Status:
Progress: Complete
Maintenance_and_Update_Frequency: none planned
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: 0.0
East_Bounding_Coordinate: 180.0
North_Bounding_Coordinate: 45.0
South_Bounding_Coordinate: -45.0
Keywords:
Theme:
Theme_Keyword_Thesaurus: CoRIS Keyword Thesaurus
Theme_Keyword: CoRIS
Theme_Keyword: Coral Reef Watch
Theme_Keyword: remote sensing
Theme_Keyword: satellite
Theme_Keyword: POES
Theme_Keyword: Polar Orbiting Environmental Satellite
Theme_Keyword: NOAA-16
Theme_Keyword: image
Theme_Keyword: map
Theme_Keyword: chart
Theme_Keyword: AVHRR
Theme_Keyword: SST
Theme_Keyword: sea surface
Theme_Keyword: sea surface temperature
Theme_Keyword: HotSpot
Theme_Keyword: coral reef bleaching HotSpot
Theme_Keyword: oceanography
Theme_Keyword: coral reef
Theme_Keyword: bleaching
Theme_Keyword: monitoring
Theme_Keyword: temperature
Theme_Keyword: thermal
Theme_Keyword: stress
Theme_Keyword: NOAA
Place:
Place_Keyword_Thesaurus: CoRIS Keyword Thesaurus
Place_Keyword: eastern hemisphere
Place_Keyword: Pacific Ocean
Place_Keyword: Atlantic Ocean
Place_Keyword: Indian Ocean

Temporal:
Temporal_Keyword_Thesaurus: none
Temporal_Keyword: none
Access_Constraints: none
Use_Constraints:
Not intended for legal use. Data may contain inaccuracies due to clouded or mixed pixels.
Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Person: Alan E. Strong, NOAA Coral Reef Watch Program Manager
Contact_Organization: NOAA Coral Reef Watch Program
Contact_Address:
Address_Type: mailing and physical address
Address: NOAA E/RA3, Room 711, 5200 Auth Road
City: Camp Springs
State_or_Province: Maryland
Postal_Code: 20746
Country: USA
Contact_Voice_Telephone: 301-763-8102 ext 170
Contact_Facsimile_Telephone: 301-763-8108
Contact_Electronic_Mail_Address: Alan.E.Strong@noaa.gov
Browse_Graphic:
Browse_Graphic_File_Name:
http://www.osdpd.noaa.gov/PSB/EPS/SST/data/hotspote.6.2.2001.gif
Browse_Graphic_File_Description:
The chart is the full-size archived "NOAA Experimental Satellite Twice-Weekly 50km Coral Reef Bleaching HotSpot Chart (Eastern Hemisphere)
Browse_Graphic_File_Type: GIF
DISTRIBUTION_INFORMATION
Distributor:
Contact_Information:
Contact_Organization_Primary:
Contact_Person: Alan E. Strong, NOAA Coral Reef Watch Program Manager
Contact_Organization: NOAA Coral Reef Watch Program
Contact_Address:
Address_Type: mailing and physical address
Address: NOAA E/RA3, Room 711, 5200 Auth Road
City: Camp Springs
State_or_Province: Maryland
Postal_Code: 20746
Country: USA
Contact_Voice_Telephone: 301-763-8102 ext 170
Contact_Facsimile_Telephone: 301-763-8108
Contact_Electronic_Mail_Address: Alan.E.Strong@noaa.gov
Distribution_Liability:
NOAA makes no warranty regarding these data, expressed or implied, nor does the fact of distribution constitute such a warranty. NOAA cannot assume liability for any damages caused by any errors or omissions in these data, nor as a result of the failure of these data to function on a particular system.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: GIF format
Format_Information_Content: Coral Reef Bleaching HotSpot
Transfer_Size: 46KB

Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name:
http://www.osdpd.noaa.gov/PSB/EPS/SST/data/hotspote.6.2.2001.gif
Network_Resource_Name:
ftp, contact the distributor for details
Network_Resource_Name:
email, contact the distributor for details
Offline_Option:
Offline_Media: CD-ROM
Recording_Format: none
Compatibility_Information:
The GIF format is recognized by most graphics applications.
Fees: none
Ordering_Instructions:
The product in GIF format may be downloaded from the Web site or obtained from the distributor.
METADATA_REFERENCE_INFORMATION
Metadata_Date: 20010602
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Person: Alan E. Strong, NOAA Coral Reef Watch Program Manager
Contact_Organization: NOAA Coral Reef Watch Program
Contact_Address:
Address_Type: mailing and physical address
Address: NOAA E/RA3, Room 711, 5200 Auth Road
City: Camp Springs
State_or_Province: Maryland
Postal_Code: 20746
Country: USA
Contact_Voice_Telephone: 301-763-8102 ext 170
Contact_Facsimile_Telephone: 301-763-8108
Contact_Electronic_Mail_Address: Alan.E.Strong@noaa.gov
Metadata_Standard_Name: FGDC CSDGM
Metadata_Standard_Version: FGDC-STD-001-1998

Sample 2

This sample is primarily for illustrating some NBII elements, particularly, taxonomy. Please note that some line-wrapping exists because of the page size limitation.

```
Identification_Information:
  Citation:
    Citation_Information:
      Originator:  Sea Grant/University of Hawaii at Manoa
       Publication_Date:  19990101
      Title:  Coral reef community, Mokapu Ocean Outfall, Oahu, HI 1998, NODC   # 0000173
      Geospatial_Data_Presentation_Form:  Figure NA
      Series_Information:
         Series_Name:  None
         Issue_Identification:  Project Report PR-99-09
      Publication_Information:
          Publication_Place:  Honolulu, HI
          Publisher: Department of Environmental Services, City and County of Honolulu, HI
      Other_Citation_Details:  Project report for a five-year biological and sediment monitoring
            program on the marine communities near the city's (Honolulu, HI) ocean sewer outfalls.
      Online_Linkage:  http://www.nodc.noaa.gov/col/projects/access/get2000.html
  Description:
     Abstract: This report provides the results of the first quantitative survey of the coral reef
                  communities in the vicinity of the Mokapu Ocean Outfall in Kailua Bay, Oahu,
               Hawaii. This survey, conducted in April and July 1998, focuses on benthic and fish
               community structure and is designe to detect community changes that may be
               mediated by the release of treated sewage through the outfall. The results of this first
               survey indicate  that the marine communities in the study area are diverse, with well-
               developed fish and coral components.
     Purpose:  To determine the status of the marine resources in the vicinity of the discharge in
               an effort to quantitatively ascertain if any impacts are occurring to the coral reef biota.
     Supplemental_Information:  Sampling periods: 27 April 1998; 27 July 1998; 31 July 1998
          All files given as MS WORD 97 documents and redundant text files.
  Time_Period_of_Content:
    Time_Period_Information:
      Range_of_Dates/Times:
         Beginning_Date:  19980427
         Ending_Date:  19980731
    Currentness_Reference:  ground condition
  Status:
    Progress:  Complete
    Maintenance_and_Update_Frequency:  As needed
  Spatial_Domain:
     Description_of_Geographic_Extent:  Vicinity of Mokapu Ocean Outfall, Oahu, Hawaii
     Bounding_Coordinates:
         West_Bounding_Coordinate:  -157.773
          East_Bounding_Coordinate:  -157.716
          North_Bounding_Coordinate:  21.433
          South_Bounding_Coordinate:  21.45
  Keywords:
     Theme:
        Theme_Keyword_Thesaurus:  CoRIS Theme Keyword Thesaurus 1.0
        Theme_Keyword:  EARTH SCIENCE > Biosphere > Zoology > Corals
```

Theme_Keyword: EARTH SCIENCE > Oceans > Coastal Processes > Coral
Theme_Keyword: EARTH SCIENCE > Oceans > Coastal Processes > Coral Reefs > Coral Reef Ecology > Coral Cover
Theme_Keyword: EARTH SCIENCE > Oceans > Coastal Processes > Coral Reefs > Coral reef ecology > Coral Reef Biodiversity
Theme_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef damage assessment > Pollution
Theme_Keyword: EARTH SCIENCE > Oceans > Marine Biology > Marine Invertebrates > Census
Theme_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment
Theme_Keyword: EARTH SCIENCE > Oceans > Marine Biology > Fish > Fish Census
Theme_Keyword: EARTH SCIENCE > Biosphere > Vegetation > Algae
Theme_Keyword: Macrothalloid algae
Theme_Keyword: EARTH SCIENCE > Oceans > Marine Biology > Fish

Theme:
Theme_Keyword_Thesaurus: CoRIS Discovery Thesaurus Version 1.0
Theme_Keyword: Numeric Data Sets > Benthic
Theme_Keyword: Numeric Data Sets > Fish Census
Theme_Keyword: Numeric Data Sets > Biology
Theme_Keyword: Numeric Data Sets > Oceanographic

Place:
Place_Keyword_Thesaurus: CoRIS Keyword Thesaurus
Place_Keyword: OCEAN BASIN > Pacific Ocean > Central Pacific Ocean > Hawaiian Islands > Oahu Island > Mokapu (21N157W0023)
Place_Keyword: COUNTRY/TERRITORY > United States of America > Hawaii > Honolulu > Mokapu (21N157W0023)
Place_Keyword: Pacific Ocean
Place_Keyword: Hawaii
Place_Keyword: Coastal waters of Hawaii
Place_Keyword: Oahu, Hawaii
Place_Keyword: Kailua Bay, Hawaii

Stratum:
Stratum_Keyword_Thesaurus: CoRIS Keyword Thesaurus
Stratum_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment > Benthos analysis
Stratum_Keyword: benthos

Taxonomy:
Keywords/Taxon:
Taxonomic_Keyword_Thesaurus: Terms from originator data files
Taxonomic_Keywords: Algae
Taxonomic_Keywords: Fish
Taxonomic_Keywords: Corals
Taxonomic_Keywords: Cnidaria
Taxonomic_Keywords: Anthozoa
Taxonomic_Keywords: Zoantheria
Taxonomic_Keywords: Scleractinia
Taxonomic_Keywords: Actinaria
Taxonomic_Keywords: Octocorallia
Taxonomic_Keywords: Pisces
Taxonomic_Keywords: Osteichthyes
Taxonomic_System:
Classification_System/Authority:
Classification_System_Citation:
Citation_Information:
Originator: ITIS organization and partners: U.S. Department of Agriculture;

National Oceanic and Atmospheric Administration; U.S. Geological Survey; Smithsonian Institution; U.S. Environmental Protection Agency; National Biological Information Infrastructure; Agriculture and Agri-Food Canada; U.S. National Park Service; Conabio (Comisión nacional para el conocimiento y uso de la biodiversidad - Mexico)
Publication_Date: 20020602
Title: Integrated Taxonomic Information System (ITIS)
Edition: None
Geospatial_Data_Presentation_Form: Database NA
Publication_Information:
Publication_Place: World Wide Web at URL: http://www.itis.usda.gov/itis_query.html
Publisher: Integrated Taxonomic Information System (ITIS) organization and partners
Classification_System_Modifications: Organsims identified to genus and/or species and genus by data originator (PI); the Integrated Taxonomic Information System (ITIS) and other online classification guides were utilized by NODC to complete upper levels of classification in this metadata record; no original data are altered by NODC. Upper level classification was added to this metadata record at NODC to facilitate the development of metadata-based search engines.
Taxonomic_Procedures: See references in original data files
Taxonomic_Completeness: Not described in original data files
General_Taxonomic_Coverage: Organisms listed in original data to family, genus, and species.
Taxonomic_Classification:
Taxon_Rank_Name: Kingdoms
Taxon_Rank_Value: Animalia, Plantae, Monera
Taxonomic_Classification:
Taxon_Rank_Name: Kingdom
Taxon_Rank_Value: Plantae
Taxonomic_Classification:
Taxon_Rank_Name: Division-Phylum
Taxon_Rank_Value: Rhodophycota
Applicable_Common_Name: Red algae
Taxonomic_Classification:
Taxon_Rank_Name: Class
Taxon_Rank_Value: Rhodophyceae
Applicable_Common_Name: Algae
Taxonomic_Classification:
Taxon_Rank_Name: Order
Taxon_Rank_Value: Ceramiales
Applicable_Common_Name: Algae
Taxonomic_Classification:
Taxon_Rank_Name: Family
Taxon_Rank_Value: Rhodomelaceae
Applicable_Common_Name: Algae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Taxon_Rank_Value: Acanthophora
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Acanthophora sp.
Taxonomic_Classification:
Taxon_Rank_Name: Genus

Taxon_Rank_Value: Laurencia
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Laurencia obtusa (= Fucus obtusus, syn.)
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Laurencia sp.
Taxonomic_Classification:
Taxon_Rank_Name: Family
Taxon_Rank_Value: Ceramiaceae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Taxon_Rank_Value: Centroceras
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Centroceras clavulatum (= Ceramium clavulatum, syn.)
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Centroceras sp.
Taxonomic_Classification:
Taxon_Rank_Name: Order
Taxon_Rank_Value: Cryptonemiales
Taxonomic_Classification:
Taxon_Rank_Name: Family
Taxon_Rank_Value: Corallinaceae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Taxon_Rank_Value: Amphiroa
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Amphiroa brasiliana
Taxonomic_Classification:
Taxon_Rank_Name: Kingdom
Taxon_Rank_Value: Animalia
Taxonomic_Classification:
Taxon_Rank_Name: Division-Phylum
Taxon_Rank_Value: Cnidaria
Taxonomic_Classification:
Taxon_Rank_Name: Class
Taxon_Rank_Value: Anthozoa
Taxonomic_Classification:
Taxon_Rank_Name: Order
Taxon_Rank_Value: Scleractinia
Applicable_Common_Name: stony corals
Taxonomic_Classification:
Taxon_Rank_Name: Family
Taxon_Rank_Value: Acroporidae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Taxon_Rank_Value: Acropora
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Acropora cervicornis
Applicable_Common_Name: staghorn coral
Taxonomic_Classification:

Taxon_Rank_Name: Family
Taxon_Rank_Value: Agariciidae
Taxonomic_Classification:
Taxon_Rank_Name: Genus
Taxon_Rank_Value: Agaricia
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Agaricia agaricites
Applicable_Common_Name: lettuce coral
Taxonomic_Classification:
Taxon_Rank_Name: Species
Taxon_Rank_Value: Agaricia fragilis
Access_Constraints: None
Use_Constraints: None
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Patrick Caldwell
Contact_Organization: NOAA/NODC/National Coastal Data Development Center
Contact_Position: NOAA/NODC Hawaii/Pacific Liaison
Contact_Address:
Address_Type: mailing and physical address
Address: JIMAR, University of Hawaii at Manoa, 1000 Pope Road
City: Honolulu
State_or_Province: HI
Postal_Code: 96822
Country: U.S.A.
Contact_Voice_Telephone: 808-956-4105
Contact_Facsimile_Telephone: 808-956-2352
Contact_Electronic_Mail_Address: Patrick.Caldwell@noaa.gov
Hours_of_Service: 8:00 a.m. to 4:00 p.m. Monday through Friday
Contact_Instructions: call, write, e-mail, FAX, leave voice mail
Data_Set_Credit: Dr. James E. T. Moncur and Dr. Richard E. Brock
Native_Data_Set_Environment: Microsoft Word 97
Data_Quality_Information:
Logical_Consistency_Report: Not applicable
Completeness_Report: See methodology description and/or originator data files
Lineage:
Methodology:
Methodology_Type: Field
Methodology_Identifier:
Methodology_Keyword_Thesaurus: CoRIS Keyword Thesaurus
Methodology_Keyword: Fish community
Methodology_Keyword: Fish census
Methodology_Keyword: Species composition
Methodology_Keyword: Species richness
Methodology_Keyword: Biological monitoring
Methodology_Keyword: Benthic survey
Methodology_Keyword: Coral coverage
Methodology_Keyword: Percent cover
Methodology_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment > Benthos analysis > Quadrat monitoring
Methodology_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment > Reef fish census > Linear transect

Methodology_Description: Fish: Visual census of fish within an established 4m X 20m transect; estimated length recorded.
Invertebrates/corals: 1m X 1m quadrat placed at 5 specific locations within a transect for repeated measurements; estimation of corals and other sessile forms recorded as percent cover.

Process_Step:
Process_Description: See originator data methodology description

Spatial_Data_Organization_Information:
Indirect_Spatial_Reference: Data collected from transects established in the vicinity of the Mokapu Ocean Outfall (discharge pipe for secondary treated sewage, Kailua Regional Wastewater Treatment Plant) in Kailua Bay, Oahu, Hawaii

Distribution_Information:
Distributor:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: NOAA National Oceanographic Data Center
Contact_Position: NODC User Services
Contact_Address:
Address_Type: mailing and physical address
Address: 1315 East-West Highway, SSMC3, 4th Floor
City: Silver Spring
State_or_Province: MD
Postal_Code: 20910
Country: U.S.A.
Contact_Voice_Telephone: 301-713-3277 or 3280
Contact_Facsimile_Telephone: 301-713-3302
Contact_Electronic_Mail_Address: nodc.services@noaa.gov
Hours_of_Service: 8:30 AM through 6:00 PM EST, Monday through Friday
Contact_Instructions: Phone/e-mail/FAX/voice mail message
Resource_Description: NODC Accession #0000173
Distribution_Liability: NOAA makes no warranty regarding these data, expressed or implied, nor does the fact of distribution constitute such a warranty. NOAA and NODC cannot assume liability for any damages caused by any errors or omissions in these data, nor as a result of the failure of these data to function on a particular system.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: MS Word document
Format_Version_Number: Microsoft Word 97
Format_Specification: MS WORD 97 documents with duplicate ASCII text .txt) files
Format_Information_Content: All files given as MS WORD 97 ocuments and redundant text files.

FILENAME	SIZE	COMMENT
mofm98.doc	267776	Original data report with tables
mo98doc.txt	40246	Original data report in text format without tables
mo98app.doc	46080	
mo98app.txt	3183	Appendix: Results of the Quantitative Visual Fish Censuses Conducted at Five Locations in Kailua Bay, Oahu, Hawai, in 1998
mo98tb1.doc	27136	
mo98tb1.txt	1323	TABLE 1. Summary of Biological Observations made at Transect T-1 on the Mokapu Ocean Outfall

Diffuser on 27 July 1998.
mo98tb2.doc 26112
mo98tb2.txt 1357 TABLE 2. Summary of Biological Observations made at Transect T-2, 15 m North of and Parallel to the Mokapu Ocean Outfall Diffuser Pipe on Natural Substratum, on 31 July 1998.
mo98tb3.doc 27648
mo98tb3.txt 1386 TABLE 3. Summary of Biological Observations made at Transect T-3 (Station B) South of Mokolea Rock in Kailua Bay on 27 April 1998.
mo98tb4.doc 27648
mo98tb4.txt 1361 TABLE 4. Summary of Biological Observations made at Transect T-4 (Station B) South of Mokolea Rock in Kailua Bay on 27 April 1998.
mo98tb5.doc 28672
mo98tb5.txt 1491 TABLE 5. Summary of Biological Observations made at Transect T-5 Inshore of Mokolea Rock in Kailua Bay on 27 April 1998.
mo98tb6.doc 24064
mo98tb6.txt 735 TABLE 6. Summary of Biological Parameters Measured at the Five Transect Locations in the 1998 Survey
File_Decompression_Technique: Uncompressed file
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name:
http://www.nodc.noaa.gov/col/projects/access/get2000.html
Access_Instructions: NODC Data Direct functions through standard Internet browsers; FTP capability required; access "Data Direct" through the NODC website at www.nodc.noaa.gov; go to "year 2000" and select NODC Accession # 0000173
Online_Computer_and_Operating_System: PC, Unix, or Mac, standard Internet browser, FTP capability, Microsft Word 97 or higher or compatible software suggested.
Fees: None
Ordering_Instructions: Download through via NODC's "Data Direct" system at the NODC homepage at www.nodc.noaa.gov or contact NODC for custom order. (When requesting data from the NODC, the desired data set may be referred to by the 7-digit number given in the RESOURCE DESCRIPTION field of this metadata record).
Turnaround: Usually within 24 hours or less if downloaded via the Internet
Custom_Order_Process: Contact the NODC User Services Group via phone/FAX/E-mail nodc.services@noaa.gov
Technical_Prerequisites: MS-WORD 97 or higher or compatible suggested
Available_Time_Period:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20000822
Ending_Date: Present
Metadata_Reference_Information:
Metadata_Date: 20000822
Metadata_Review_Date: 20020731
Metadata_Future_Review_Date: 20030131
Metadata_Contact:

Contact_Information:
Contact_Person_Primary:
Contact_Person: Sheri Phillips
Contact_Organization: NOAA/NODC
Contact_Position: Oceanographer
Contact_Address:
Address_Type: mailing and physical address
Address: 1315 East-West Highway, E/OC1, SSMC3, 4th Floor
City: Silver Spring
State_or_Province: MD
Postal_Code: 20910
Country: U.S.A.
Contact_Voice_Telephone: 301-713-3280 x127
Contact_Facsimile_Telephone: 301-713-3302
Contact_Electronic_Mail_Address: sheri.phillips@noaa.gov
Hours_of_Service: 9:30 AM - 6 PM EST Monday-Thursday
Contact_Instructions: E-mail, phone, FAX, mail
Metadata_Standard_Name: Content Standard for Digital Geospatial Metadata
Part 1 Biological Data Profile
Metadata_Standard_Version: FGDC-STD-001.1-1999
Metadata_Time_Convention: local time
Metadata_Access_Constraints: None
Metadata_Use_Constraints: None

Appendix B. ASCII Template for CoRIS Metadata

CoRIS metadata template, with no comments, can be copied and used to complete metadata information for CoRIS. See Instructions for completing metadata fields for specific guidance.

```
Metadata:
  Identification_Information:
    Citation:
      Citation_Information:
        Originator:
        Publication_Date:
        Title:
        Online_Linkage:
    Description:
      Abstract:
      Purpose:
    Time_Period_of_Content:
      Time_Period_Information:
        Single_Date/Time:
          Calendar_Date:
        Multiple_Dates/Times:
          Single_Date/Time:
            Calendar_Date:
        Range_of_Dates/Times:
          Beginning_Date:
          Ending_Date:
      Currentness_Reference:
    Status:
      Progress:
      Maintenance_and_Update_Frequency:
    Spatial_Domain:
     Description_of_Geographic_Extent:
      Bounding_Coordinates:
        West_Bounding_Coordinate:
        East_Bounding_Coordinate:
        North_Bounding_Coordinate:
        South_Bounding_Coordinate:
    Keywords:
      Theme:
        Theme_Keyword_Thesaurus:
        Theme_Keyword:
    Taxonomy:
      Keywords/Taxon:
        Taxonomic_Keyword_Thesauris:
        Taxonomic_Keyword:
      Taxonomic_System:
         Classification_System/Authority:
            Classification_System_Citation
              Citation_Information:
      General_Taxonomic_Coverage:
          Taxonomic_Classification:
             Taxon_Rank_Name:
             Taxon_Rank_Value:
             Applicable_Common_Name:
```

```
  Access_Constraints:
  Use_Constraints:
  Browse_Graphic:
    Browse_Graphic_File_Name:
    Browse_Graphic_File_Description:
    Browse_Graphic_File_Type:
Distribution_Information:
  Distributor:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Person:
      Contact_Organization_Primary:
        Contact_Organization:
      Contact_Address:
        Address_Type:
        Address:
        City:
        State_or_Province:
        Postal_Code:
      Contact_Voice_Telephone:
  Distribution_Liability:
  Standard_Order_Process:
    Non-digital_Form:
    Digital_Form:
      Digital_Transfer_Information:
        Format_Name:
      Digital_Transfer_Option:
        Online_Option:
          Computer_Contact_Information:
            Network_Address:
              Network_Resource_Name:
        Offline_Option:
          Offline_Media:
          Recording_Format:
    Fees:
    Ordering_Instructions:
Metadata_Reference_Information:
  Metadata_Date:
  Metadata_Contact:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Person:
      Contact_Organization_Primary:
        Contact_Organization:
      Contact_Address:
        Address_Type:
        Address:
        City:
        State_or_Province:
        Postal_Code:
      Contact_Voice_Telephone:
  Metadata_Standard_Name:
  Metadata_Standard_Version:
```

Appendix C. Basic FGDC Template for Metadata

This template includes the original set of FGDC metadata fields, and is provided for those who wish to use specific sections in addition to those required for CoRIS. For element definitions and domain values, please refer to the FGDC Content Standard for Digital Geospatial Metadata (CSDGM) http://www.fgdc.gov/standards/documents/standards/metadata/v2_0698.pdf or the CSDGM workbook, http://www.fgdc.gov/metadata/meta_workbook.html (in Adobe PDF form).

```
Metadata:
  Identification_Information:
    Citation:
      Citation_Information:
        Originator:
        Publication_Date:
        Publication_Time:
        Title:
        Edition:
        Geospatial_Data_Presentation_Form:
        Series_Information:
          Series_Name:
          Issue_Identification:
        Publication_Information:
          Publication_Place:
          Publisher:
        Other_Citation_Details:
        Online_Linkage:
        Larger_Work_Citation:
          Citation_Information:
    Description:
      Abstract:
      Purpose:
    Time_Period_of_Content:
      Time_Period_Information:
        Single_Date/Time:
          Calendar_Date:
          Time_of_Day:
        Multiple_Dates/Times:
          Single_Date/Time:
            Calendar_Date:
            Time_of_Day:
        Range_of_Dates/Times:
          Beginning_Date:
          Beginning_Time:
          Ending_Date:
          Ending_Time:
      Currentness_Reference:
    Status:
      Progress:
      Maintenance_and_Update_Frequency:
    Spatial_Domain:
      Bounding_Coordinates:
        West_Bounding_Coordinate:
        East_Bounding_Coordinate:
        North_Bounding_Coordinate:
        South_Bounding_Coordinate:
```

```
  Data_Set_G-Polygon:
    Data_Set_G-Polygon_Outer_G-Ring:
      G-Ring_Point:
        G-Ring_Latitude:
        G-Ring_Longitude:
      G-Ring:
    Data_Set_G-Polygon_Exclusion_G-Ring:
      G-Ring_Point:
        G-Ring_Latitude:
        G-Ring_Longitude:
      G-Ring:
Keywords:
  Theme:
    Theme_Keyword_Thesaurus:
    Theme_Keyword:
  Place:
    Place_Keyword_Thesaurus:
    Place_Keyword:
  Stratum:
    Stratum_Keyword_Thesaurus:
    Stratum_Keyword:
  Temporal:
    Temporal_Keyword_Thesaurus:
    Temporal_Keyword:
Access_Constraints:
Use_Constraints:
Point_of_Contact:
  Contact_Information:
    Contact_Person_Primary:
      Contact_Person:
      Contact_Organization:
    Contact_Organization_Primary:
      Contact_Organization:
      Contact_Person:
    Contact_Position:
    Contact_Address:
      Address_Type:
      Address:
      City:
      State_or_Province:
      Postal_Code:
      Country:
    Contact_Voice_Telephone:
    Contact_TDD/TTY_Telephone:
    Contact_Facsimile_Telephone:
    Contact_Electronic_Mail_Address:
    Hours_of_Service:
    Contact_Instructions:
Browse_Graphic:
  Browse_Graphic_File_Name:
  Browse_Graphic_File_Description:
  Browse_Graphic_File_Type:
Data_Set_Credit:
Security_Information:
  Security_Classification_System:
  Security_Classification:
  Security_Handling_Description:
```

```
    Native_Data_Set_Environment:
    Cross_Reference:
      Citation_Information:
        Originator:
        Publication_Date:
        Publication_Time:
        Title:
        Edition:
        Geospatial_Data_Presentation_Form:
        Series_Information:
          Series_Name:
          Issue_Identification:
        Publication_Information:
          Publication_Place:
          Publisher:
        Other_Citation_Details:
        Online_Linkage:
        Larger_Work_Citation:
          Citation_Information:
  Data_Quality_Information:
    Attribute_Accuracy:
      Attribute_Accuracy_Report:
      Quantitative_Attribute_Accuracy_Assessment:
        Attribute_Accuracy_Value:
        Attribute_Accuracy_Explanation:
    Logical_Consistency_Report:
    Completeness_Report:
    Positional_Accuracy:
      Horizontal_Positional_Accuracy:
        Horizontal_Positional_Accuracy_Report:
        Quantitative_Horizontal_Positional_Accuracy_Assessment:
          Horizontal_Positional_Accuracy_Value:
          Horizontal_Positional_Accuracy_Explanation:
      Vertical_Positional_Accuracy:
        Vertical_Positional_Accuracy_Report:
        Quantitative_Vertical_Positional_Accuracy_Assessment:
          Vertical_Positional_Accuracy_Value:
          Vertical_Positional_Accuracy_Explanation:
    Lineage:
      Source_Information:
        Source_Citation:
          Citation_Information:
            Originator:
            Publication_Date:
            Publication_Time:
            Title:
            Edition:
            Geospatial_Data_Presentation_Form:
            Series_Information:
              Series_Name:
              Issue_Identification:
            Publication_Information:
              Publication_Place:
              Publisher:
            Other_Citation_Details:
            Online_Linkage:
            Larger_Work_Citation:
```

```
            Citation_Information:
        Source_Scale_Denominator:
        Type_of_Source_Media:
        Source_Time_Period_of_Content:
          Time_Period_Information:
            Single_Date/Time:
              Calendar_Date:
              Time_of_Day:
            Multiple_Dates/Times:
              Single_Date/Time:
                Calendar_Date:
                Time_of_Day:
            Range_of_Dates/Times:
              Beginning_Date:
              Beginning_Time:
              Ending_Date:
              Ending_Time:
          Source_Currentness_Reference:
        Source_Citation_Abbreviation:
        Source_Contribution:
      Process_Step:
        Process_Description:
        Source_Used_Citation_Abbreviation:
        Process_Date:
        Process_Time:
        Source_Produced_Citation_Abbreviation:
        Process_Contact:
          Contact_Information:
            Contact_Person_Primary:
              Contact_Person:
              Contact_Organization:
            Contact_Organization_Primary:
              Contact_Organization:
              Contact_Person:
            Contact_Position:
            Contact_Address:
              Address_Type:
              Address:
              City:
              State_or_Province:
              Postal_Code:
              Country:
            Contact_Voice_Telephone:
            Contact_TDD/TTY_Telephone:
            Contact_Facsimile_Telephone:
            Contact_Electronic_Mail_Address:
            Hours_of_Service:
            Contact_Instructions:
  Cloud_Cover:
Spatial_Data_Organization_Information:
  Indirect_Spatial_Reference:
  Direct_Spatial_Reference_Method:
  Point_and_Vector_Object_Information:
    SDTS_Terms_Description:
      SDTS_Point_and_Vector_Object_Type:
      Point_and_Vector_Object_Count:
    VPF_Terms_Description:
```

```
      VPF_Topology_Level:
      VPF_Point_and_Vector_Object_Information
        VPF_Point_and_Vector_Object_Type:
        Point_and_Vector_Object_Count:
  Raster_Object_Information:
    Raster_Object_Type:
    Row_Count:
    Column_Count:
    Vertical_Count:
Spatial_Reference_Information:
  Horizontal_Coordinate_System_Definition:
    Geographic:
      Latitude_Resolution:
      Longitude_Resolution:
      Geographic_Coordinate_Units:
    Planar:
      Map_Projection:
        Map_Projection_Name:
        Albers_Conical_Equal_Area:
          Standard_Parallel:
          Longitude_of_Central_Meridian:
          Latitude_of_Projection_Origin:
          False_Easting:
          False_Northing:
        Azimuthal_Equidistant:
          Longitude_of_Central_Meridian:
          Latitude_of_Projection_Origin:
          False_Easting:
          False_Northing:
        Equidistant_Conic:
          Standard_Parallel:
          Longitude_of_Central_Meridian:
          Latitude_of_Projection_Origin:
          False_Easting:
          False_Northing:
        Equirectangular:
          Standard_Parallel:
          Longitude_of_Central_Meridian:
          False_Easting:
          False_Northing:
        General_Vertical_Near-sided_Perspective:
          Height_of_Perspective_Point_Above_Surface:
          Longitude_of_Projection_Center:
          Latitude_of_Projection_Center:
          False_Easting:
          False_Northing:
        Gnomonic:
          Longitude_of_Projection_Center:
          Latitude_of_Projection_Center:
          False_Easting:
          False_Northing:
        Lambert_Azimuthal_Equal_Area:
          Longitude_of_Projection_Center:
          Latitude_of_Projection_Center:
          False_Easting:
          False_Northing:
        Lambert_Conformal_Conic:
```

```
      Standard_Parallel:
      Longitude_of_Central_Meridian:
      Latitude_of_Projection_Origin:
      False_Easting:
      False_Northing:
    Mercator:
      Standard_Parallel:
      Scale_Factor_at_Equator:
      Longitude_of_Central_Meridian:
      False_Easting:
      False_Northing:
    Modified_Stereographic_for_Alaska:
      False_Easting:
      False_Northing:
    Miller_Cylindrical:
      Longitude_of_Central_Meridian:
      False_Easting:
      False_Northing:
    Oblique_Mercator:
      Scale_Factor_at_Center_Line:
      Oblique_Line_Azimuth:
        Azimuthal_Angle:
        Azimuth_Measure_Point_Longitude:
      Oblique_Line_Point:
        Oblique_Line_Latitude:
        Oblique_Line_Longitude:
      Latitude_of_Projection_Origin:
      False_Easting:
      False_Northing:
    Orthographic:
      Longitude_of_Projection_Center:
      Latitude_of_Projection_Center:
      False_Easting:
      False_Northing:
    Polar_Stereographic:
      Straight-Vertical_Longitude_from_Pole:
      Standard_Parallel:
      Scale_Factor_at_Projection_Origin:
      False_Easting:
      False_Northing:
    Polyconic:
      Longitude_of_Central_Meridian:
      Latitude_of_Projection_Origin:
      False_Easting:
      False_Northing:
    Robinson:
      Longitude_of_Projection_Center:
      False_Easting:
      False_Northing:
    Sinusoidal:
      Longitude_of_Central_Meridian:
      False_Easting:
      False_Northing:
    Space_Oblique_Mercator_(Landsat):
      Landsat_Number:
      Path_Number:
      False_Easting:
```

```
      False_Northing:
    Stereographic:
      Longitude_of_Projection_Center:
      Latitude_of_Projection_Center:
      False_Easting:
      False_Northing:
    Transverse_Mercator:
      Scale_Factor_at_Central_Meridian:
      Longitude_of_Central_Meridian:
      Latitude_of_Projection_Origin:
      False_Easting:
      False_Northing:
    van_der_Grinten:
      Longitude_of_Central_Meridian:
      False_Easting:
      False_Northing:
    Map_Projection_Parameters:
  Grid_Coordinate_System:
    Grid_Coordinate_System_Name:
    Universal_Transverse_Mercator:
      UTM_Zone_Number:
      Transverse_Mercator:
        Scale_Factor_at_Central_Meridian:
        Longitude_of_Central_Meridian:
        Latitude_of_Projection_Origin:
        False_Easting:
        False_Northing:
    Universal_Polar_Stereographic:
      UPS_Zone_Identifier:
      Polar_Stereographic:
        Straight-Vertical_Longitude_from_Pole:
        Standard_Parallel:
        Scale_Factor_at_Projection_Origin:
        False_Easting:
        False_Northing:
    State_Plane_Coordinate_System:
      SPCS_Zone_Identifier:
      Lambert_Conformal_Conic:
        Standard_Parallel:
        Longitude_of_Central_Meridian:
        Latitude_of_Projection_Origin:
        False_Easting:
        False_Northing:
      Transverse_Mercator:
        Scale_Factor_at_Central_Meridian:
        Longitude_of_Central_Meridian:
        Latitude_of_Projection_Origin:
        False_Easting:
        False_Northing:
      Oblique_Mercator:
        Scale_Factor_at_Center_Line:
        Oblique_Line_Azimuth:
          Azimuthal_Angle:
          Azimuth_Measure_Point_Longitude:
        Oblique_Line_Point:
          Oblique_Line_Latitude:
          Oblique_Line_Longitude:
```

```
            Latitude_of_Projection_Origin:
            False_Easting:
            False_Northing:
          Polyconic:
            Longitude_of_Central_Meridian:
            Latitude_of_Projection_Origin:
            False_Easting:
            False_Northing:
        ARC_Coordinate_System:
          ARC_System_Zone_Identifier:
          Equirectangular:
            Standard_Parallel:
            Longitude_of_Central_Meridian:
            False_Easting:
            False_Northing:
          Azimuthal_Equidistant:
            Longitude_of_Central_Meridian:
            Latitude_of_Projection_Origin:
            False_Easting:
            False_Northing:
        Other_Grid_System's_Definition:
      Local_Planar:
        Local_Planar_Description:
        Local_Planar_Georeference_Information:
      Planar_Coordinate_Information:
        Planar_Coordinate_Encoding_Method:
        Coordinate_Representation:
          Abscissa_Resolution:
          Ordinate_Resolution:
        Distance_and_Bearing_Representation:
          Distance_Resolution:
          Bearing_Resolution:
          Bearing_Units:
          Bearing_Reference_Direction:
          Bearing_Reference_Meridian:
        Planar_Distance_Units:
    Local:
      Local_Description:
      Local_Georeference_Information:
    Geodetic_Model:
      Horizontal_Datum_Name:
      Ellipsoid_Name:
      Semi-major_Axis:
      Denominator_of_Flattening_Ratio:
  Vertical_Coordinate_System_Definition:
    Altitude_System_Definition:
      Altitude_Datum_Name:
      Altitude_Resolution:
      Altitude_Distance_Units:
      Altitude_Encoding_Method:
    Depth_System_Definition:
      Depth_Datum_Name:
      Depth_Resolution:
      Depth_Distance_Units:
      Depth_Encoding_Method:
Entity_and_Attribute_Information:
  Detailed_Description:
```

```
      Entity_Type:
        Entity_Type_Label:
        Entity_Type_Definition:
        Entity_Type_Definition_Source:
      Attribute:
        Attribute_Label:
        Attribute_Definition:
        Attribute_Definition_Source:
        Attribute_Domain_Values:
          Enumerated_Domain:
            Enumerated_Domain_Value:
            Enumerated_Domain_Value_Definition:
            Enumerated_Domain_Value_Definition_Source:
            Attribute:
          Range_Domain:
            Range_Domain_Minimum:
            Range_Domain_Maximum:
            Attribute_Units_of_Measure:
            Attribute_Measurement_Resolution:
            Attribute:
          Codeset_Domain:
            Codeset_Name:
            Codeset_Source:
          Unrepresentable_Domain:
        Beginning_Date_of_Attribute_Values:
        Ending_Date_of_Attribute_Values:
        Attribute_Value_Accuracy_Information:
          Attribute_Value_Accuracy:
          Attribute_Value_Accuracy_Explanation:
        Attribute_Measurement_Frequency:
    Overview_Description:
      Entity_and_Attribute_Overview:
      Entity_and_Attribute_Detail_Citation:
  Distribution_Information:
    Distributor:
      Contact_Information:
        Contact_Person_Primary:
          Contact_Person:
          Contact_Organization:
        Contact_Organization_Primary:
          Contact_Organization:
          Contact_Person:
        Contact_Position:
        Contact_Address:
          Address_Type:
          Address:
          City:
          State_or_Province:
          Postal_Code:
          Country:
        Contact_Voice_Telephone:
        Contact_TDD/TTY_Telephone:
        Contact_Facsimile_Telephone:
        Contact_Electronic_Mail_Address:
        Hours_of_Service:
        Contact_Instructions:
    Resource_Description:
```

```
  Distribution_Liability:
  Standard_Order_Process:
    Non-digital_Form:
    Digital_Form:
      Digital_Transfer_Information:
        Format_Name:
        Format_Version_Number:
        Format_Version_Date:
        Format_Specification:
        Format_Information_Content:
        File_Decompression_Technique:
        Transfer_Size:
      Digital_Transfer_Option:
        Online_Option:
          Computer_Contact_Information:
            Network_Address:
              Network_Resource_Name:
            Dialup_Instructions:
              Lowest_BPS:
              Highest_BPS:
              Number_DataBits:
              Number_StopBits:
              Parity:
              Compression_Support:
              Dialup_Telephone:
              Dialup_File_Name:
          Access_Instructions:
          Online_Computer_and_Operating_System:
        Offline_Option:
          Offline_Media:
          Recording_Capacity:
            Recording_Density:
            Recording_Density_Units:
          Recording_Format:
          Compatibility_Information:
    Fees:
    Ordering_Instructions:
    Turnaround:
  Custom_Order_Process:
  Technical_Prerequisites:
  Available_Time_Period:
    Time_Period_Information:
      Single_Date/Time:
        Calendar_Date:
        Time_of_Day:
      Multiple_Dates/Times:
        Single_Date/Time:
          Calendar_Date:
          Time_of_Day:
      Range_of_Dates/Times:
        Beginning_Date:
        Beginning_Time:
        Ending_Date:
        Ending_Time:
Metadata_Reference_Information:
  Metadata_Date:
  Metadata_Review_Date:
```

```
Metadata_Future_Review_Date:
Metadata_Contact:
  Contact_Information:
    Contact_Person_Primary:
      Contact_Person:
      Contact_Organization:
    Contact_Organization_Primary:
      Contact_Organization:
      Contact_Person:
    Contact_Position:
    Contact_Address:
      Address_Type:
      Address:
      City:
      State_or_Province:
      Postal_Code:
      Country:
    Contact_Voice_Telephone:
    Contact_TDD/TTY_Telephone:
    Contact_Facsimile_Telephone:
    Contact_Electronic_Mail_Address:
    Hours_of_Service:
    Contact_Instructions:
Metadata_Standard_Name:
Metadata_Standard_Version:
Metadata_Time_Convention:
Metadata_Access_Constraints:
Metadata_Use_Constraints:
Metadata_Security_Information:
  Metadata_Security_Classification_System:
  Metadata_Security_Classification:
  Metadata_Security_Handling_Description:
Metadata_Extensions:
  Online_Linkage:
  Profile_Name:
```

Appendix D. Informal Review of Metadata Software

Information on, and the latest versions of, CNS, MP and other software tools are available at http://www.geology.usgs.gov/tools/metadata/

Other software packages that have been available are listed here for information purposes. This list does not imply endorsement of these products by CoRIS, NOAA, or the Federal Government.

1) SMMS (Spatial Metadata Management System)

Availability: Commercial software, see URL at http://www.intergraph.com/gis/smms/

Comments: Powerful commercial package incorporating FGDC/NBII elements, fairly user-intuitive with comfortable interface (matches or exceeds Metamaker in capabilities, reportedly under consideration by the U.S. Department of Interior as a standard package). Note: Ownership of SMMS has recently changed; product is scheduled for updating. Cost may be prohibitive; not designed to be distributed freely:
Single user license: $595
2-9 organizational license: $575
10-24 organizational license: $500

2) Metamaker

Availability: **Metamaker is no longer being distributed online;** see URL at http://www.umesc.usgs.gov/metamaker/nbiimker.html

Comments: Fully documents all data types; but some elements cumbersome, not user-intuitive, parsers Afussy@. Exports/saves ASCII files in FGDC/NBII standard format; utilizes CNS and MP parsers to generate clearinghouse-ready files. No new versions planned for development by the USGS/Dept. of Interior. (Effective program, but can be tedious to use; cumbersome in editing keyword lists, Aprimitive@ export capabilities - i.e., exports entire keyword list, cannot export keywords by section). Users are advised to upgrade the incorporated CNS and MP parsers to the latest versions (downloadable from the U.S. Geological Survey website at: http://geology.usgs.gov/tools/metadata/

Metamaker does not put taxonomic information in the NBII standard structure.

3) Metalite 1.7.5

Availability: Free, see URL at http://edcnts11.cr.usgs.gov/metalite/

Comments: Shorter FGDC-compliant metadata system also developed by the USGS; built with minimal FGDC elements. No test version online; download program for review. User-intuitive with a simple interface, with documentation. **Multi-lingual** (English, Spanish, French, Portguese). Utilizes MP to generate clearing-house ready metadata as .TXT, .HTML, and .XML files.

Example of organization-specific tool (built in-house)

4) COMET

Availability: Free, see URL at http://www.chesapeakebay.net/comet/login.cfm

Comments: A condensed, FGDC-compliant online metadata system developed, implemented, and utilized by the Chesapeake Bay Program (incorporates needs of state and Federal researchers). **Test version** available at this site; possible **model** for successful development and

implementation of CORIS Ashort@ metadata form; possibly able to work with Bay Program programmers to revamp this form for coral reefs. **This system is NOT for general use, but serves as an example/model of a working FGDC/NBII compliant metadata tool built by an individual organization to provide researchers with the ability to generate metadata through an online interface.**

5) TKME

Availability: Free, see URL at http://geology.usgs.gov/tools/metadata/tools/doc/tkme.html

Comments: Another FGDC-compliant metadata system also developed by the USGS. No test version online; download program for review. The program is user-intuitive with a simple interface, with documentation. TKME can be used to build a standard metadata record but might not handle the elements for the Biological Profile (i.e. taxonomy). (Under investigation at this time).

6) MetaStar from Blue Angel Technologies

Availability: Commercial software, see URL at http://www.blueangeltech.com .

7) M^3Cat

Availability: Free from FGDC http://www.fgdc.gov/metadata/toollist/m3cat.html

Comments: The multistandard and multilingual metadata cataloguing M³Cat is a powerful tool for the creation of geospatial metadata. Users can configure their own metadata fields and customize the interface; and supports FGDC, NBII, GILS and ISO, and translations between standards. M^3Cat works in a web environment.

The technical prerequisites to install M³Cat are:

Microsoft Windows NT Server with the IIS 4.0 module (Internet Information Service), Microsoft Windows NT WorkStation with the PWS module (Peer Web Services) installed.